Research Paper

Innovative Chief Urban Designer System in Design Governance

A case study of Guangzhou City, China

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Abstract

"Chief urban designer" refers to a "chief designer's team" consists of "N" professionals that led by an urban design expert or architectural design expert (that is, it is a non-governmental public organization funded and recognized by the government). It serves as a technical force to assist the government's planning and governance. This paper takes the practice of " chief urban designer" conducted in Yuexiu District, Guangzhou as the research object. The author has been sent to the Yuexiu Planning Bureau for half a year as a member of the chief designer's team in 2019. Field observation on tasks participated by the team is conducted, and unstructured interview method is applied on 10 civil servants and 10 members of the team. Based on the study of the concept and theoretical framework of design governance, this paper analyzes the practice of design governance conducted by "chief designer and the team" in the process of assisting governmental design governance. The results show that the roles of the planners or architects of the chief designers are divided. The chief designers of Yuexiu and the team members play six roles: controller, coordinator, referee, promoter, consultant and designer. Chief designers play different roles in different segments and use diversified governance tools to deal with different governance tasks. Chief designers in Yuexiu and the team members use four informal design governance tools: research, practice guidelines, design review and authorization. Practice has proved that the chief designer's team can effectively promote the implementation of urban design and achieve more inclusive, innovative and diversified design governance. This study innovatively expands the research framework of the main role and behavioral pattern of governing subjects, analyzes the cases with chief designer's participation, and provides practical cases of urban design governance in China with the purpose of inspiring more scholars at home and abroad to conduct joint research on this topic.

Keywords

urban design, design governance, chief urban designer system, chief designer's team

1. Introduction

By 2020, the urbanization rate of permanent population in China has exceeded 66%, and urban development is shifting to a new stage of vitalizing urban space to high-quality construction and promoting the refinement of urban governance. In China's current administrative system, government departments of prefecture-level and district-level cities are main force of the urban construction governance. The district government departments have problems of low professional and technical

strength, low organizational efficiency, fuzzy evaluation standard. Apart from this, original urban detailed regulatory plans are not enough to cope with diversified development goals and interests of various parties. It is urgent to use relevant professional and technical forces for assistance. Since 2014, the municipal government of Guangzhou has tried to seek support from external professional and technical forces and explored the "chief urban designer system". That is, a "chief designer's team" form by professionals that led by an urban design expert or architectural design expert (that is, the non-governmental public organizations funded and recognized by the government). This is an emerging system to solve the problem of urban design implementation and control. It has been applied in nearly 30 key urban areas in Guangzhou, Shenzhen, Zhuhai and other cities around Pearl River Delta. In recent years, a research field of "Design Governance" has emerged from the discipline of urban Design. Design Governance is an innovative academic concept that introduced urban governance into urban Design by British scholar Matthew Carmona (2016). At present, the research on its practice and theory is still in its infancy. By interpreting the concept and toolbox of design governance and taking the practice of the chief designer in Yuexiu as an example, this paper analyzes the role differentiation of the chief designer and the team in the design governance and the informal design governance tools used.

2. Exploration and Practice of Chief Urban Designer System

2.1. Origins and evolution of chief urban designer system

Throughout the developmental history of Chinese and foreign cities, it is not difficult to find that the capital or core city of every country once had a chief designer to guide its planning, design or construction. After the 20th century, the community planner system, architect responsibility system and other micro-scale designer service system were adopted gradually. For example, in 581, Emperor Wen of Sui Dynasty appointed Yu Wenkai to take charge of the construction of Daxing City, the capital of Sui Dynasty in a short period. Yu was responsible for urban planning and design while his assistants for construction and material management, and Gao Jiong for comprehensive planning. In the mid-19th century, Napoleon III appointed Baron Georges-Eugene Haussmann as the chief designer to lead the comprehensive renovation of the historic city - Paris. In 1951, the Prime Minister of India appointed Le Corbusier as the chief design to take charge of the urban planning and architectural design of Chandigarh. In 1967, Jonathan Barnett was appointed by Mayor Lindsay of New York to set up an urban design team, and to some extent, he became the chief designer of New York City as a representative of the mayor. In the 1960s, the practice of community planning begun in the western developed countries such as Britain, the United States and Japan which had a high degree of urbanization and relatively mature urban development, and the system was rapidly promoted.

2.2. Practice of chief urban designer system in China

The chief urban designer's team is an emerging technical team of "planning, architecture and landscape design" hired by the district government in Guangzhou and Shenzhen in recent years. The governments authorize review power, such as the right of planning suggestion and scheme review, but it still lacks the authorization of local administrative legislation. The chief designer's team usually consists of professionals led by one or two leading designers. Part of the work done by such organizations is originally part of the planning and design services provided by governmental procurement enterprises. They undertake the transfer of government functions, entrusting and purchase services according to the contract, and provide the government with planning decision-making consultation, technical consultation, scheme review and other services. For instance, the chief designer's consultant team of Guangzhou International Financial City (2012-present) is a consulting service project for "Key chief urban designer"

carried out by Tianhe District of Guangzhou to promote the urban construction. Academician He Jingtang and his team are employed. They provide design consulting and design review services for scheme compilation, regulation optimization and adjustment, construction and other links. Based on urban design guidelines, chief designer's team of Guangzhou Pazhou Western E-commerce Headquarter Area (2014-present) promotes fine dynamic and elastic management of monomer building design, as well as project implementation management with multi-party coordination, and participates in the whole process of "plan consultation, approval, and in-depth implementation verification" after land transfer, which promotes the construction of the area with high quality . At present, cities of the Guangdong-Hong Kong-Macao Greater Bay Area, especially those around Guangzhou and Shenzhen, are carrying out scattered practice of the chief designer system for key areas (see Table 1). Meanwhile, Shenzhen plans to implement the system in 18 key areas.

Year	City	District	Area	Model of hiring chief designer's team	Administrative department
2012	Guangzhou	International Financial Area	8 km^2	"1+N"	Guangzhou Land Resources and Planning Commission
2014	Guangzhou	Pazhou Western E-commerce Headquarter Area	2.1km^2	"1+N"	Guangzhou Land Resources and Planning Commission
2017	Guangzhou	Yuexiu District	33.8km^2	"1+N"	Yuexiu Branch of Guangzhou Planning and Natural Resources Bureau
2017	Shenzhen	International convention area	22.58 km^2	"2+N"	Construction Headquarters Office of Shenzhen International Convention Center
2018	Zhuhai	Hengqin New Area and bonded area, Hongwan, Wan Chai integrated developmental area	26 km^2	"1+N"	Zhuhai Municipal Party Committee and Government, Hengqin New Area Management Committee, Bonded Area Management Committee
2018	Shenzhen	Super Headquarters Base Core Area of Shenzhen Bay	1.17km^2	"1+N"	Shenzhen Municipal Government
2019	Shenzhen	Business Center of Shenzhen North Railway Station	6.1 km^2	"2+N"	Key Regional Construction Promotion Center of Longhua District
2019	Shenzhen	Pingshan Central district	24.08 km^2	"1+N"	Planning and Development Center for Key Area of Shenzhen Pingshan District
2019	Shenzhen	The Grand Airport area	45.5 km^2	"2+N"	New Area Development Affairs Center of the Grand Airport
2019	Shenzhen	Guangming Science City	99 km^2	"1+N"	Development and Construction Department of Guangming District Science City
2019	Shenzhen	Baguang Zore Startup Area of Shenzhen International Bio-valley	6 km^2	"1+N"	Dapeng Authority Of Shenzhen Planning, Land and Resources Commission
2020	Dongguan	International Business Arear	1.6 km^2	"2+N"	Dongguan Central Construction Headquarters

Table 1: A partial overview of the practice of " Chief urban Designer System" being carried out in the Guangdong-Hong Kong-Macao Greater Bay Area. Source: interviews by the author

Note: "1+N" refers to 1 leading chief designer and N professional technical teams, "2+N" refers to 2 leading chief designers and N professional technical teams.

2.3. Literature Review

In 2016, based on the research on the relationship between urban design and public policy, Matthew Carmona introduced the concept of governance and urban governance theory into the field of urban design, and demonstrated the relevant cases of the British Commission for Architecture and Built Environment (CABE) from 1999 to 2010. The concept of "design governance" was proposed for the first time, and it is suggested to be further studied as a sub-field of urban design. Subsequently, John Punter, Jonathan Barnett and other British and American scholars of urban design agreed with this issue and proposed that the academic community should jointly conduct research on it. Since 2018, some experts and scholars of urban design in China have paid attention to it and conducted research on the design governance theory proposed by Carmona (Tang Yan, Yang Zhen, Zhu He et al., 2018). Some scholars understand "Design Governance" as "Urban Design Governance". Chinese academic circles has not researched it systematically, and there is lack of research results. And there are just researches in single digits on cnki.com, and there are related research limited in description of the innovation practice of the system, and its definition has not yet formed. There is a lack of research on theory sources, system construction and the causes. Some Chinese scholars in the fields of public administration and creative design have also begun to discuss "design governance" (Yang Zhi, Cai Zhihong, Guo Shu, Qin Hongling, Zhao Shaoyin, 2020). As an innovative academic concept of public management, politics and urban design, "design governance" has been in the initial and expanding stage with consensus at home and abroad.

3. Concept and Toolbox of Design Governance

3.1. Concept and purpose

Carmona defines design governance as "The process of state-sanctioned intervention in the means and processes of designing the built environment in order to shape both processes and outcomes in a defined public interest". The idea suggests establishing an actions and decision tree consists of experts, investors, and citizens by taking the government as the core, it proposes to optimize the urban design process through formal and informal governance tools (Zhu He, Tang Yan, 2018), it is essentially discussing the basic principle of state intervention in urban design, and all forms of design governance are of an essentially political, and they are part of the political process of judging the nature of "good" design. National institutions and society have been trying to intervene in the design and the shape of built environment to achieve public interests, the functions, economic growth, social inclusion, heritage conservation, environmental protection, aesthetic control. Carmona thinks that design governance is not only for better design and places with higher quality, it is also for better governance processes.

3.2. Toolbox of design governance

Governmental tools defined by public policy research   refer to the various tools, methods and actions employed by decision makers to guide the environment and organize actors to achieve desired outcomes made by specific policy. Since the 1990s, the neoliberalism has made tools available to the government increase sharply. The tools or means used to solve public policy problems in European countries have spread around rapidly. Some European scholars used typology to study and classify existing governmental tools(Christopher Hood 1983, McDonnell&Elmore 1987, Schneider&Ingram 1990, Evert Vedung 1998, Lester Salamon 2000, Lascoumes &Le Gales 2007,Vabo 2009). Schuster (1997) proposed five types of tools that could represent "the implementation of governmental policy of urban design": operation, supervision, incentive, establishment and information. Building on this, Carmona was thinking over how a

tool-based approach could relate to design governance. He explored the typology of tools of design governance to analyze and understand design governance. First of all, he divides design governance tools into formal and informal ones. Formal tools are the methods applied by governmental public departments in the process of urban design with clear state power and legal effect. The central government would authorize local governments to perform their functions. Informal tools are the methods applied by third parties which indirectly participates in urban design other than the government and the public. They are between "traditional" design governance and "private" company management, and are not guaranteed and restricted by laws. Secondly, formal and informal tools are classified according to the degree of intervention. Formal design governance tools are divided into three types of "guidance, incentive and control" with 12 specific items: guidance tools including design standards, principles, policies and framework, incentive tools including subsidies, direct investment, process management, and control tools are reward, contribution to the development, usage, licensing and approval (see figure 1); The framework of formal tools helps to understand the way urban design works in the public sectors; Informal tools are divided into five categories of "evidence, knowledge, promotion, evaluation and assistance" with15 specific items, which are from the design governance practices of CABE from 1999 to 2010. Design governance tools run through the whole process of urban design and operation, but only in in a certain link or stage of operation, can each tool play its role.
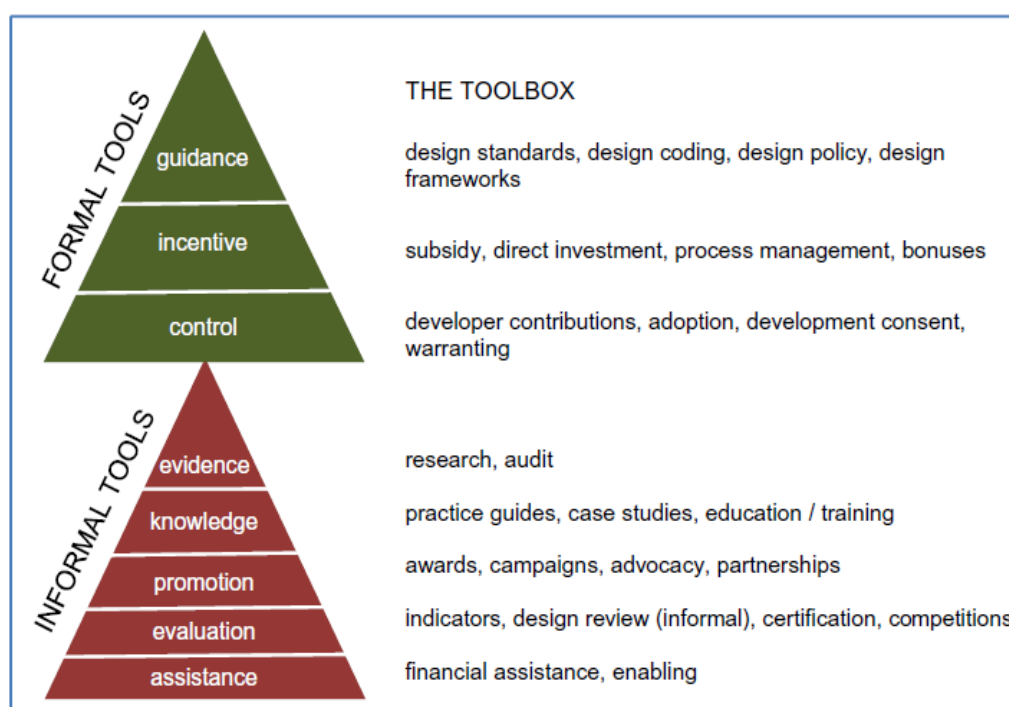
Figure 1. The complete design governance toolbox(formal and informal). Source: CARMONA M. The formal and informal tools of design governance. Journal of Urban Design, 2017. 22(1): p. 1-36.

4. Practice of Design Governance in Yuexiu by Chief Designer and the Team

In 2017, Yuexiu government by bidding hired teams of planning, architecture, landscape, set up chief designer team of city axis of traditional city. It is China's first implementation of the practice of chief designer system of historical city. The team takes urban design outline and the historical block protection planning as a core, taking charge of reconstruction of the blocks, coordinating urban renewal, formulating

aging linkage implementation and participating in collaborative design. It is found that the team plays six roles: controller, coordinator, referee, promoter, consultant and designer. Four informal design governance tools are used: research, practice guide, design review and authorization.

4.1. Spatial scope and content of design governance by the team

Spatial scope

One of the spatial scope is the consulting scope of the whole district design scheme delimited by the Yuexiu administrative region (see figure 2): about 33.8 square kilometers; the other is the quality improvement scope including blocks of Central axis area, historical and cultural blocks of Beijing Road, and Wendenan historical and cultural blocks and the surrounding blocks of Yanjiang Road (see figure 3): about 4.5 square kilometers.
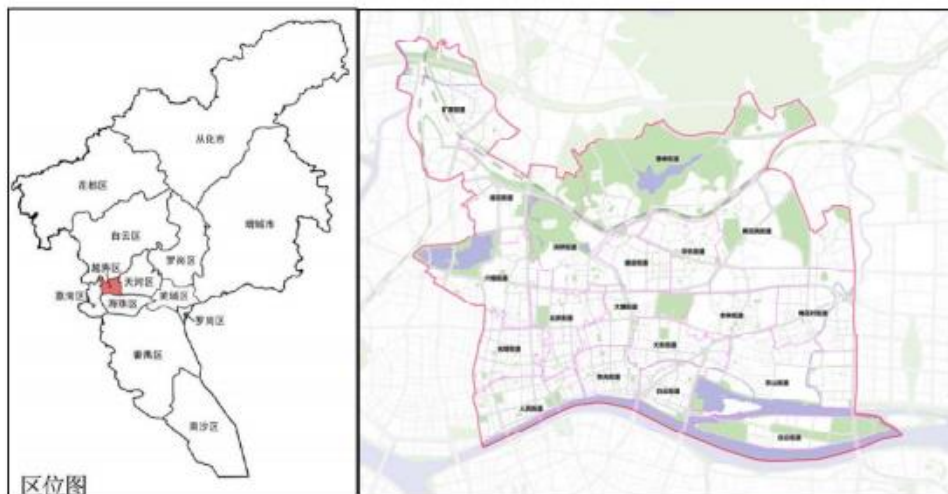
Figure 2: The left is the location map of Yuexiu District in Guangzhou, and the right is the administrative zoning map of Yuexiu District. Source: Baidu Baike.
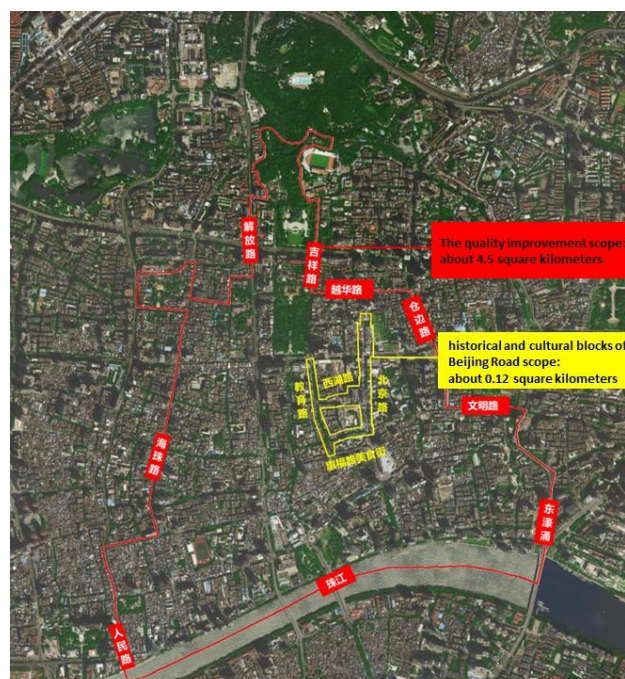
Figure 3: Scope of quality improvement of axis area. Source: Baidu Map and author's drawing

Contents of the design governance

Urban built environment is the direct object of design governance of the team. The contents of design control by the team are shown in the following table (see table 4). The key points of design control are: 1. the macro control of the urban spatial structure, the traditional central axis district is involved in Guangzhou development strategies of "develop economy, innovation and landscape of cities around the Zhujiang River", the team, from the perspective of overall urban space development pattern, controls the spatial structure and urban landscape continuity. Because Yuexiu is an old city, it focuses on stock of land with less incremental land planning and construction, the team doesn't have to work on its land use and traffic 2. The protection and reuse of historic blocks. The traditional central axis district contains more historical and cultural blocks, the team then combs it into five classes with more than 138 high-quality blocks and 30 elite paths. It is to protect the block texture, traffic network, public space, and redesign and use the street interface and landscape, night lighting; 3. Improving the quality of public space and architectural styles. The team refurbishes and renovates the architectural form and roof greening at the lot-based area.

Contents of the design governance by the team

Aspects	Fields	Contents
City (macroscopic)	**Spatial structure**	1. Axis (axis cord): the traditional central axis of Beijing Road, the modern central axis of Guangzhou Qiyi Road, the Pearl River vitality belt of Yanjiang Road and the vitality display belt of Danan Road constitute the two-axis and two-belt spatial structure of the area.
		2. Landscape: retain the landscape pattern of "mountain-city-river" in guangzhou's historic urban area;
		3. Spatial layout: On the basis of the existing spatial pattern of the built environment, other spatial structure systems are superimposed, including cultural heritage trails, tourist trails, characteristic streets, characteristic blocks, etc., so as to form a multi-system spatial structure;
		4. Harmonize with the overall urban planning and development strategy.
	City landscape	1. Styles zoning: four key and other coordinated styles areas. Lead the styles of current buildings and new buildings in each area.
Blocks (medium)	**Block texture**	1. Road network of blocks: divide blocks by traffic orientation, slow down orientation and pedestrian street (lane) according to nature of street, reshape street style, guide traffic oriented road reconstruction and construction of arcade street;
		2. Building texture: Delimit the protection area and construction control area of historical buildings, strictly protect the historical buildings, and the new construction, expansion and reconstruction within the control zone shall be carried out in accordance with the guidance of historical buildings.
		3. Urban water system pattern: lead the restoration of urban water system pattern, including Guangzhou ancient city wall, ancient city water system and other cultural relics and historical sites, as well as protection measures for urban wall pattern, Yudai Hao, Liumaiqu canal and other ancient city water system pattern.
	Traffic network	1. Optimization of Vehicle system:
		2. Docking stations

	Public space	1. Parks: improve the quality of street parks, people's parks and other small parks;
		2. Square: improve quality of North Square of Giant Buddha Temple, Haizhu Square;
		3. Public open space: increase the riverside public space along the Yanjiang Road, lay emphasize on the visibility and accessibility of the corridor, and improve the quality of space;
	Street interface	1. Building facade: Repair and decorate the facade of buildings along the streets, such as Guangzhou Qiyi Road, Yanjiang West Road, Changdi Boulevard Road, Taikang Road and Beijing Road;
		2. Billboards: the size and color of billboards along the street are coordinated with the building facade;
	Street landscape	1. Preservation of trees: famous and ancient trees with large roots and stems;
		2. Planting and greening (facade greening) : the greening project of Haizhu Square and West Yanjiang Road;
		3. Pavement: pavement style of Haizhu Square, sidewalk and square of Beijing Road, etc.;
	Others	1. Nightscape Lighting: for important axis and landmarks;
		2. New media technology: Xindaxin Glass-free 3D screen, LED screen of Binbin Square , light and shadow technology application, etc.;
Lot-based level (microcosmic)	**Architectural forms**	1. Maintenance and repair of historical buildings: restore traditional doors and windows, facade styles, remove facade tiles, convex anti-theft windows with traditional technology and structure;
		2. Skyline: harmonized with the historic neighborhood skyline;
	Roof landscape	1. Coordination of the fifth facade style: demolish the private and random roofs;
		2. Roof greening: properly set up roof greening;
	Pedestrian network	1. Divide the pavement to form a walking zone with a width ranging from 1 to 6 meters, a facility zone with a width of 2.5 meters and a building front zone with a width of 3-8 meters;
		2. Sidewalk facilities: add seats, signage systems, street lights and other urban furniture, and provide drinking water, public toilets, small businesses and other service facilities;

Table 4: Design control contents by the team in Yuexiu. Source: The interview data

4.2. Roles of the team in the process of design governance

The team plays 6 roles respectively: controllers, coordinators, referees, promoters, consultants, designers. controllers can set up advisory committee and design the tasks, build up a platform and invite the interest-related for discussion, participate in and undertake the design of the process and institutionalize it, and organize the division of labour. Coordinators mediate and negotiate in advance, specifically, to confirm and state information of background or questions, to deal with challenges from participants, to divide the work of mediation and negotiation. Referees serve as a neutral resource, occasionally as a member or chairman of a formal committee, or as a staff of the committee. Promoters are forward-looking, contributing to the consensus-building and providing impetus and ideas for other collaborative processes. Consultant can be hired by the government, or technical experts hired by lobbyists, professional staff of public agencies and private interest groups. When communicating, planners should formally put forward professional analysis and judgment, answer the technical consultation from the participants. Designers undertake part of the design tasks since they themselves are able to plan and design. (see figure 5)
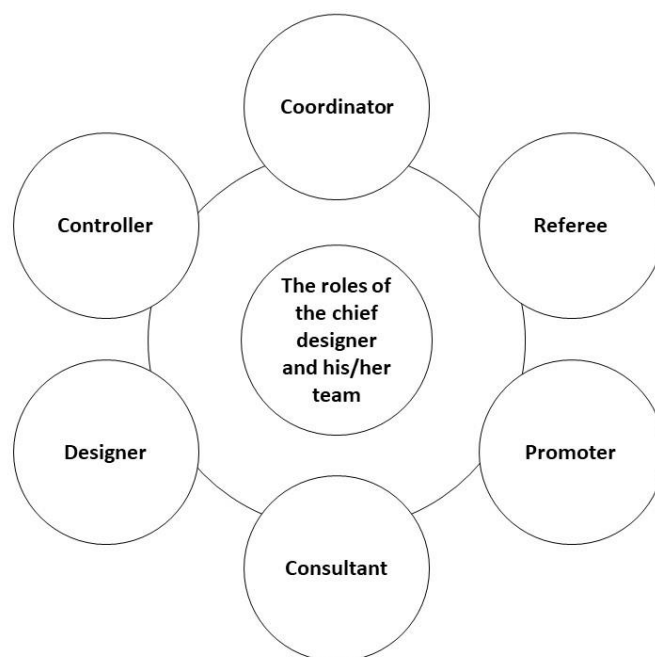
Figure 5: Roles of the chief designer and the am members. Source: drawn by the author

During the period of appointment, different services can be provided by the chief designers with different roles (see table 6). Controller should undertake the work of setting up committee, organizing meetings, convening design teams, system design; coordinator should take charge of design coordination and interest coordination; referee can undertake design review, organizing expert review, multi-party demonstration and other work; promoter can undertake project proposal, decision-making consultation; consultant can undertake design scheme consultation, on-site consultation; designer is responsible for the thematic research, planning and design.
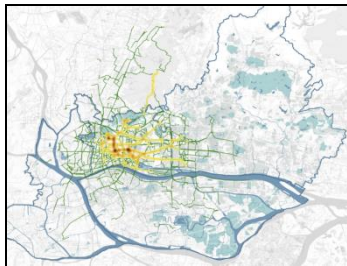
The roles of the chief designer and his/her team members	serial number	The services provided by the chief designer and his team members	
① **Controller (organizer)** Set up the committee and design its tasks, build up a platform and invite the interest-related for discussion, participate in and undertake the design of the process and institutionalize it, and organize the division of labour.	1	Set up a committee	Set up committee, design its tasks and working mechanism and organize the committee to carry out its work;
	2	Organize meetings	Organize meetings, including project planning meeting, programme coordination meeting, programme review meeting, etc.; Contact participants to attend meetings and participate in discussions;
	3	Call the design team together	Select and hire design team, divide the work and organize the design team to carry out the work;
	4	Plan the design for system	Plan the design and institutionalize it;
② **Coordinator (mediator)** Mediate and negotiate in advance, specifically, to confirm and state information of background or questions, to deal with challenges from participants, to divide the work of mediation and negotiation.	5	Design coordination	Communicate and coordinate with design teams, government functional departments, construction teams and owners to avoid conflicts, so as to reach a consensus on planning and design and promote the implementation of design schemes;
	6	Interest coordination	Communicate with the interest-related to maximize the public interests of the city;
③ **Referee** Serve as a neutral resource, occasionally as a member or chairman of a formal committee, or as a staff of the committee.	7	Design review	Be responsible for the design review of the project scheme, and put forward the opinions and results;
	8	Organize expert review	Organize the expert review meeting and conduct the expert review on the design scheme;
	9	Multi-scheme demonstration	Discuss and demonstrate the scheme in the area;
④ **Promoter** Being forward-looking, contributing to the consensus-building and providing impetus and ideas for other collaborative processes	10	Project proposal	Be responsible for the project proposal and planning, promote its approval;
	11	Decision-making consultation	Provide decision-making advisory services to decision makers;
⑤ **Consultant** They can be consultants hired by the government, or technical experts hired by lobbyists, professional staff of public agencies and private interest groups. When communicating, planners should formally put forward professional analysis and judgment, answer the technical consultation from the participants.	12	Design consultation	Provide design consulting services to the design scheme and design team;;
	13	On-site consultation	Be responsible for on-site communication and consultation;
⑥ **Designer** Undertake part of the design tasks since they themselves are able to plan and design.	14	Monographic study	The chief designer's team can carry out relevant thematic research, including current situation investigation, resource inventory;;
	15	Regional planning	Edit the Design Outline for the area to guide the construction;
	16	Detailed planning and design	Plan and design specific projects in detail.

Table 6: The roles of the chief designer and the team and the services they can provide. Source: Drawn by the author

4.3. Informal design governance tools used by Yuexiu Chief designer and the team

(1) Evidence: Research tools

Evidence tools mainly serve the government by collecting and providing evidence to support or refute design views, design objectives, and government decisions. By various research activities, it proves the rationality of the team's functions and the multi-value of urban design, and provides evidence support for government decision-making. Cooperate with other institutions, the team carries out research projects, organizes and supervises research projects, and submits research results to local government departments. The research carried out by the team are: Research on Guangzhou's Image Perception, Research on Red Index of Guangzhou Traditional Central Axis Area, Research on Protection and Display of National Archaeological Site Park of Nanyang Kingdom Palace (Project Proposal), Research on Argumentation of Bearing Structure of Haizhu Bridge, etc. (see table 7).

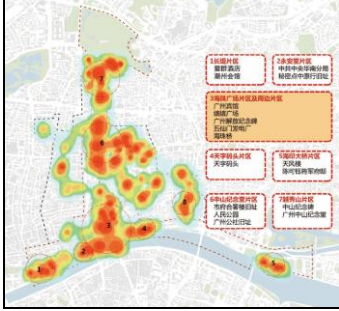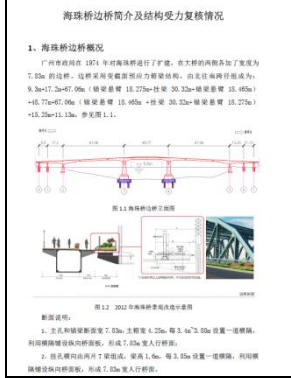| Table 7: Specific actions and research achievements using evidence tools by the team		
Topic	**Research contents and results**	**Research achievement**
Research on Guangzhou's Image Perception	Yuexiu Bureau of Education helped distribute the questionnaire. Relying on School of Architecture of South China University of Technology, using big data analysis, questionnaire, field investigation and other methods, the team identifies the city image of Guangzhou, including the online image, the actual flow rate, officially confirmed image, citizens' image, local image satisfaction. One of the results is that: the recognition degree of "People's Park - Guangzhou Qiyi Road - Haizhu Square" from north to south decreases gradually, but the that of "Haizhu Bridge - Pearl River" increases obviously, indicating that the image recognition degree of Haizhu Square on this axis is low. The research results provide evidence support for the transformation potential of Haizhu Square. Other research conclusions also provide evidence support for the team assisting in compiling the Implementation Plan of Traditional Central Axis.	Analysis chart of daily walking path of residents living inYuexiu District

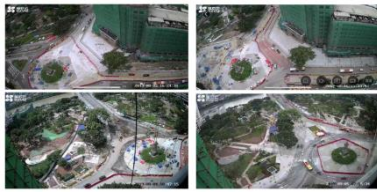| Topic	Research contents and results	Research achievement
Research on Red Index of Guangzhou Traditional Central Axis Area	The study was carried out during Haizhu square project planning phase, Yuexiu Branch of Culture and Tour Bureau provided data and information, and the team builds up red index evaluation system, and evaluate the red index of revolutionary activities of the Communist Party of China within the scope, the results show Haizhu Square, the People's Park, Zhongshan memorial hall have higher red index than other place. The conclusion provides ideas and evidence support for the "development orientation" in the planning stage of Haizhu Square upgrade project.	Analysis diagram of red index of traditional central axis area
Research on Protection and Display of National Archaeological Site Park of Nanyang Kingdom Palace (Project Proposal)	The research was carried out by the team in the planning stage of the quality improvement project of Beijing Road. With the assistance of the Nanyue Kingdom Palace Museum and Guangzhou Institute of Cultural Relics and Archaeology, the team conducted a research on the archaeology and protection status of Beijing Road, and proposed a "comprehensive research and protection of the Nanyue Kingdom Palace". And through the archaeological process, the strategies of combining education, cultural relic protection and public development space, experiential protection and utilization are proposed, the implementation of argumentation including coordinated research on the subway, municipal pipe network, road traffic; This study provides creative developmental ideas and evidence support for Beijing Road's quality improvement project.	The design proposal of tunnel with historical elements in the north section of Beijing Road
Research on Argumentation of Bearing Structure of Haizhu Bridge	The research was carried out by the team during the construction phase of the quality improvement project of Haizhu Square. The planning and design team proposed the traffic conversion scheme of Haizhu Bridge, and the Municipal Transport Research Institute questioned the feasibility of the scheme. The team was responsible for connecting with bridge engineering experts from the Municipal Transport Research Institute and the School of Civil Engineering of South China University of Technology. The vehicle capacity of auxiliary bridges on both sides of Haizhu Bridge was studied. The conclusion is that the carrying capacity is insufficient, so the traffic exchange plan proposed by the team will not be considered in the short term, and traffic control will be used instead. This study provides evidence support for the reconstruction of Haizhu Square.	Research report on review of structural stress of Haizhu Bridge

Table 7: Specific actions and research achievements using evidence tools by the team. Source: drawn by the author

（2） Knowledge：practice guides tools

Based on research and investigation, the knowledge tools aim to disseminate professional knowledge on good design, places of high quality, urban design values and practical cases. It is to raise the design awareness of practitioners and the public. Practice guides are different from urban design guides in that they are informal guidance on urban design practices and are intended to share best practices. The documents of practical guides released by the team are: The Design Outline of the Promotion Plan of Guangzhou Traditional Central Axis, The Implementation Plan of Guangzhou Traditional Central Axis (Implementation Guides), and The Implementation Guides of the Environmental Quality Improvement of Haizhu Square and its Surrounding Areas (see table 8).

Table 8: Specific actions and research achievements using practice guides tools by the team		
Topics	**Contents**	**Achievements**
The Design Outline of The Promotion Plan of Guangzhou Traditional Central Axis	Put forward the reconstruction and upgrading plan and design outline of the traditional central axis area of Guangzhou in next five years, protect the spatial pattern, blocks and streets, and provide design guidance for public space, important streets and historical buildings, and make proposals for highlight project.	Schematic diagram of spatial pattern of traditional central axis area in Guangzhou
The Implementation Plan of Guangzhou Traditional Central Axis (Implementation Guides)	Confirm "near-term, medium-term and long-term" projects, practice construction implementation guidelines such as implementing historical block protection planning and control, classifying and protecting historical buildings, integrating a series of public spaces, setting up a number of small squares and pocket parks, renovating building facade, activate historical blocks.	Characteristic cultural street in 1916(the Republic of China): Changxing Street
Implementation Guides of the Environmental Quality Improvement of Haizhu Square and its Surrounding Areas	Implementation guides of Haizhu Square transformation project including square brick selection and material selection, landscape flowers, landscape sketches, chairs, night lighting.	Guidelines of Haizhu Square renovation design and tile selection

Table 8: Specific actions and research achievements using practice guides tools by the team. Source: drawn by the author

（3） Evaluation: design review tools

Evaluation tools are to evaluate the design objectives, design process and design results of specific projects by using certain technical means and procedures. It is to influence the design results by evaluation. The third party experts provide neutral and objective design evaluation and design review services to improve design quality before the formal administrative approval. The team focuses on design review of planning and design scheme, architectural design scheme and construction scheme in Yuexiu District and putting forward review opinions. The designer of scheme will modify the scheme according to the review opinions before submitting it to the governmental department for review and approval. The form of design review has three types: written feedback, governmental design review meeting and expert review meeting. From 2018 to 2020, the team has issued about 400 written review opinions, and attended about 100 governmental review meetings and expert review meetings. After the designer's program report in the meeting, review opinions are provided(see table 9).

Table 9: Specific actions and research achievements using design review tools by the team		
Methods of review	**Design review**	
Written feedback	The team issues written feedback of design review for planning and design schemes or architectural design schemes.	
Expert review meeting	The team needs to attend the expert review meeting in the review stage and consider the impact of a single project on the spatial structure and urban style, and present review opinions at the meeting.	
Governmental design review meeting	The team is required to attend the scheme review meeting held by the government planning department to assist officials.	

Table 9: Specific actions and research achievements using design review tools by the team. Source: drawn by the author

（4）Assistance: enabling tools

Assistance tools are direct or indirect backup to specific projects with the purpose of improving design quality by using financial, technical and human resources. Empowerment refers to the provision of authorization or expert support for specific projects, where national groups, departments and research institutes provide advice and expertise. Yuexiu government authorized the planning and design team to provide assistance from project planning, scheme design to the follow-up for the reconstruction project of Haizhu Square (see table 10).

Table 10: Specific actions and research achievements using tools of enabling by the team		
Phrases with assistance	**Methods**	**Expert's assistance**
Project planning	Current situation investigation	The team conducted on-site research on Haizhu Square and its surrounding environment with relevant governmental staff, and assisted them in identifying the space environment with poor quality. The main task of the team is to put forward spatial transformation strategies.
Schematic design	Design consultation; Design coordination	The reconstruction design of Haizhu Square involves the design of traffic flow line, municipal pipeline, cultural relic protection, landscape, surrounding buildings' facade decoration, etc. The team followed up the whole process from preliminary design to improvement and final draft, providing design consultation and design coordination services.
Construction	Implement the plan	When the scheme is implemented, as the role of "implementation conduction", the team is the "bridge" between the design departments and the construction departments, giving full play to the role of technical coordination.
	Real-time monitoring	The District government set up the headquarters for quality improvement Haizhu Square to monitor the construction in real time. The team keeps on standby during the construction period for on-site consultation.
	On-site consulting	The technical personnel of the team conducts on-site consultation on design problems required by the site. For example, the construction site test traffic line: 3m tape is too concave and convex, and it is easy to be stained, so it is not recommended; Hot melt glue is needed to polish the surface, and adhesive tape is used to guard the edge before the glue. It is recommended by the team. It needs to cooperate with road construction team which could help to polish; the design of Haizhu Bridge has been determined, but the color needs to be remixed to lighter ones than the color proposed now.

Table 10: Specific actions and research achievements using tools of enabling by the team. Source: drawn by the author

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